

METAL CAN BATTERY

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of and priority to U.S. Provisional Application No. 62/897,803, filed on Sep. 9, 2019, and titled "METAL CAN BATTERY," the content of which is herein incorporated by reference in its entirety for all purposes.

FIELD

[0002] This disclosure relates generally to the formation and structural features of a rigid or semi-rigid battery housing. More particularly, the present embodiments are directed toward integration of a rigid or semi-rigid battery with other operational components of an electronic device.

BACKGROUND

[0003] Lithium-polymer batteries are commonly used as rechargeable batteries to provide power to a variety of electronic devices, including laptop computers, tablet computers, mobile phones, personal digital assistants (PDAs), digital music players and cordless power tools. Lithium-polymer batteries can often include electrodes and electrolyte sealed in an aluminized laminated pouch. These pouch batteries can be used in space-constrained portable electronic devices such as mobile phones, laptop computer, and/or wearable devices.

[0004] The sealed edges of the pouch battery can result in excess pouch material and the pouch can have a positive voltage that requires the exterior surface of the pouch to be isolated from conductive surfaces in the electronic device. To accommodate the excess pouch material and isolate the conductive surface of the pouch battery, the pouch battery needs to be smaller than the area provided in the electronic device, resulting in wasted space. This is especially important in space-constrained portable electronic devices, where space is at a premium and the devices are commonly designed to accommodate the largest batteries possible.

SUMMARY

[0005] This disclosure describes various embodiments that relate to an improved battery for reducing space between the battery and electronic components in an electronic device. In some embodiments, a battery can include a rigid or semi-rigid housing contacting components in an electronic device. For example, in some embodiments the battery includes an electrode and cathode surrounded by a metal housing. The battery can be sized to optimize the available space in the electronic device without the need for spacing between the battery housing and other components in the electronic device. In some embodiments, the metal housing can be connected to a common ground, to allow other components to contact the battery housing without causing a short circuit or corroding the components. Additionally, the metal housing can be used as a structural element in the electronic device. For example, brackets can be attached to the metal housing or a flange between two housing pieces can be using as an attachment point.

[0006] Various embodiments of the invention pertain to a rigid or semi-rigid batteries for use in an electronic device. The battery can include electrodes and an electrolyte sur-

rounded by an enclosure. In some embodiments, the electrodes can be rolled or stacked.

[0007] A battery system for use in an electronic device is disclosed and includes the following: an electrically conductive housing including a first portion having a flange around its periphery and a second portion that overlaps with the first portion and is hermetically sealed to the first portion at the flange, the first and second portions combining to define an interior cavity; an electrode assembly disposed within the interior cavity and including an anode, a cathode, and a separator between the anode and cathode; and a connection terminal electrically coupled to the electrode assembly through an opening in the housing.

[0008] A battery system is disclosed and includes the following: an electrically conductive housing having a base portion and a lid that cooperate to define a hermetically sealed interior cavity, the base portion including a bottom wall and a sidewall extending upward and away from the bottom wall to form a flange around a periphery of the housing, wherein the lid overlaps with a portion of the sidewall to form a flange and the sidewall contains an opening for selectively hermetically sealing the housing; an electrode assembly disposed within the interior cavity and including one or more anode layers, one or more cathode layers, and a separation layer between each of the anode and cathode layers, wherein the electrode assembly is electronically coupled with the housing to form a common ground; electrolyte disposed within the housing around the electrode assembly; a connection terminal electrically coupled to the electrode assembly and extending through the opening in the sidewall of the housing; and an electrically insulative spacer extending circumferentially around the connection terminal to electrically isolate the connection terminal from the housing.

[0009] A portable electronic device is disclosed and includes the following: a display; a processor; a memory; and a battery system for providing power to the display, the processor, and the memory, the battery system comprising: an electrode assembly including an anode, a cathode, and a separator; a housing defining a hermetically sealed cavity enclosing the electrode assembly; and a connection module electrically coupling the electrode assembly to the display, the processor, and the memory, a portion of the connection module extending through a sidewall of the housing to electrically couple with the electrode assembly.

[0010] To better understand the nature and advantages of the present invention, reference should be made to the following description and the accompanying figures. It is to be understood, however, that each of the figures is provided for the purpose of illustration only and is not intended as a definition of the limits of the scope of the present invention. Also, as a general rule, and unless it is evident to the contrary from the description, where elements in different figures use identical reference numbers, the elements are generally either identical or at least similar in function or purpose.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A further understanding of the nature and advantages of the disclosed embodiments can be realized by reference to the remaining portions of the specification and the drawings.

[0012] FIG. 1 is a simplified illustration of a previously known pouch battery;